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December 26, 1959

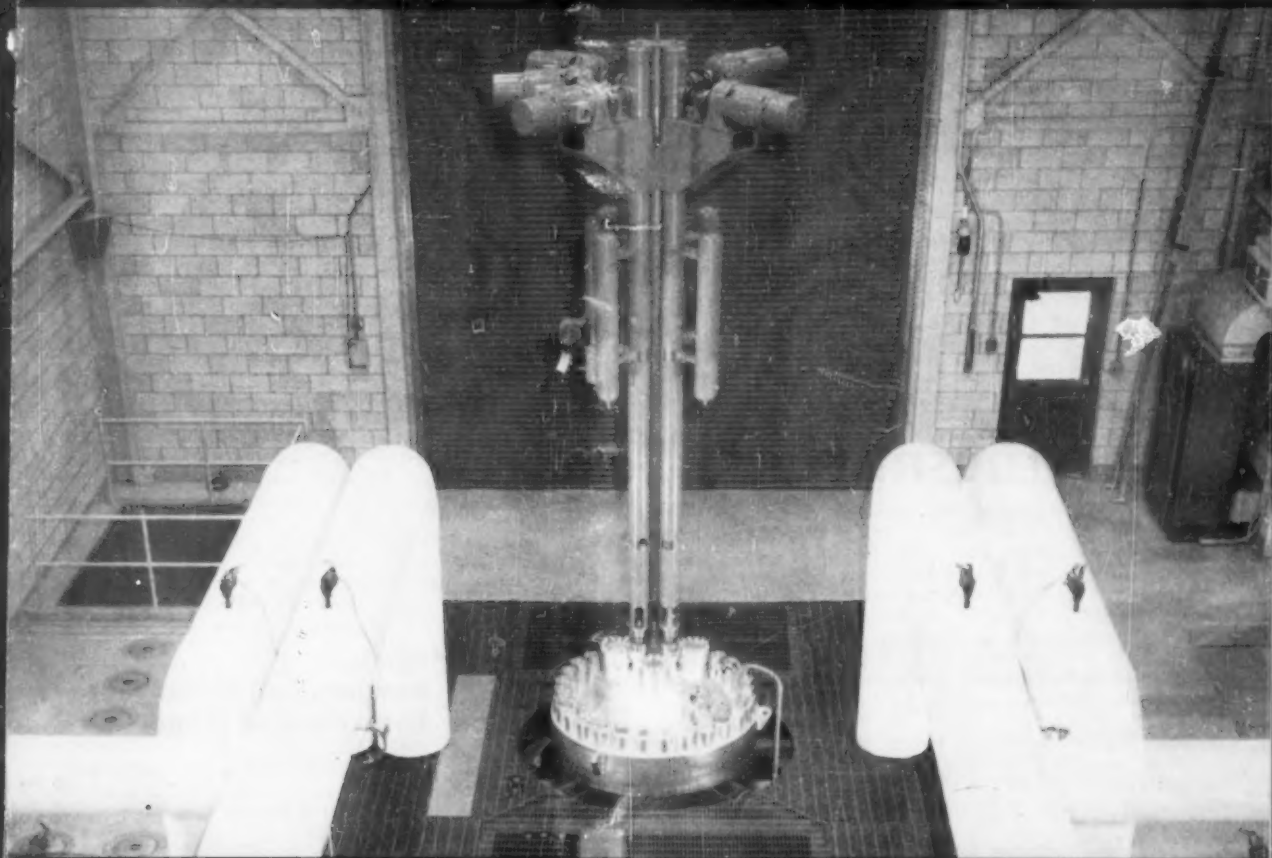
INDEX

VOL. 75, NO. 26

PAGES 425-430

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Versatile Reactor

See Page 427

A SCIENCE SERVICE PUBLICATION

PUBLIC HEALTH

A-Wastes Stored in Glass

BOTH CANADIAN and Russian scientists have made good progress in their attempts to incorporate highly radioactive wastes into glass in order to store them safely in artificial vaults or bury them underground.

Scientists working with the Atomic Energy of Canada Limited have succeeded in making glass containing up to 50 curies of five- to six-year-old mixed fission products per kilogram.

One of the problems during the infiltration process of the radioactive wastes into the glass, volatility of two fission products, ruthenium and cesium, has successfully been overcome by the use of iron oxide as an adsorber for ruthenium and a silicate for the adsorption of cesium. The experiments also proved that the rate of leaching of fission products depends on the composition of the glass.

Very little leaching occurs and this decreases with time.

The method of ultimate storage depends both on the properties of the glass and the concentration of fission products in it. In case of short decay times of the radioactive isotopes contained in the glass artificial cooling might become necessary in order to avoid an undesirable increase of tempera-

ture in the burying grounds. While artificial cooling would probably be too expensive, adequate cooling can be achieved by burial in dry ground.

L. C. Watson, when presenting these findings of the Atomic Energy of Canada Ltd. to his colleagues during the international meeting in Monaco organized by the International Atomic Energy Agency and UNESCO, also indicated that a demonstration plant is planned to incorporate all existing wastes stored at Chalk River into glass. This glass would then be used for a large scale test of a selected method of disposal.

P. V. Zimakov of the U.S.S.R. said the problem of incorporation of highly radioactive wastes into glass under high temperatures has also been studied in his country.

Soviet scientists, however, have not succeeded in making the product completely insoluble. They consider that any further improvements in the insolubility would depend on a reduction of the size of the crystals in the glass and on other chemical factors. Mr. Zimakov agreed that the fixation of highly radioactive waste into glass before burial of waste products would increase the safety.

Science News Letter, December 26, 1959

GENERAL SCIENCE

Conformism Hurts Science

IMAGINATIVE engineering and scientific research in the United States is being shackled by conformism, and if this country is to compete with Europe and Japan, engineers and scientists must start taking risks "way out in left field."

Dr. B. R. Teare, dean of the College of Engineering and Science at the Carnegie Institute of Technology, said that because of scientific disciplines, scientists fall into ruts.

They often pursue research with an immediate objective in mind—called "hole plugging" at a conference on research goals held at the Worcester Polytechnic Institute, Worcester, Mass.

There is no recognition for the scientist who pioneers in a "risky" area and whose research fails to bear scientific fruit. So the type of research that leads to great breakthrough discoveries commands little attention in the laboratories because of the risks involved.

Dr. Carl C. Chambers, vice president of the University of Pennsylvania, said this is typical of our society—that we are afraid to take risks.

"Our societies have become extremely conformist, and this has permeated the fields of engineering and science."

Dr. John Hollomon, associate director of research for the General Electric Company, said scientists who are willing to take risks should receive recognition simply because

they are willing to take risks, even if the "risky" project fails to bear fruit.

He said U. S. industry must start taking risks especially to find ways of meeting economic competition from Europe and Japan.

Dr. Hollomon also stated that "we spend too much time selling ideas." Whether the researcher is in industry or a university, he must spend so much effort promoting his special idea that he has little chance to work on it.

Dr. Lee DuBridge, president of California Institute of Technology, suggested that some way be found to "get away from the organization man in engineering and research." At present, research frequently falls within the framework of "the project," supervised by the "project engineer." Miles of red tape must be cut by the researcher whose interest lies outside the project.

Failure in the U. S. to foster development of pioneering research-minded scientists, Dr. Teare said, stems from failure to "start early enough with the boys who are interested." At the latest, some effort must be made in the first year of college to develop their scientific research bent, and preferably this should occur as early as at the high school level.

Hitting at the sluggish inspiration a promising student may get, the preface to the conference's program states:

"Many factors contribute to this lack of

originality. Our educational processes are not efficient in developing the creative mind; our graduate study programs often require that students select discreet theses projects, usually along well-trodden paths, and they discourage venturing forth into the unknown; our scientific and engineering societies provide forums for the presentation of reports on accomplished research but seldom attempt to project into the future."

Science News Letter, December 26, 1959

ENGINEERING

Wave-Riding Dolphins Puzzle Scientists

"A GRAVEYARD to our wits"—that is how one scientist describes the dolphin.

These "rascals" are pleasing to watch playing around in the ocean, but how dolphins manage to ride the waves as they do remains an unsolved puzzle, reports Dr. P. F. Scholander of the Scripps Institution of Oceanography, La Jolla, Calif.

So far it has been impossible to show experimentally how the dolphin gets a free ride swimming near a ship's bow, Dr. Scholander points out in *Science* (130, 1657, Dec. 11, 1959).

One theory, described by Dr. Wallace D. Hayes of Princeton University in the same issue of *Science*, is that a streamlined body of neutral buoyancy—the dolphin—can be propelled within a wave at wave velocity. This is not accepted by all researchers, however.

Another problem concerning the dolphin that has "rather worried students of theoretical fluid mechanics: 'How can the dolphin swim several times faster than predicted from drag and muscle power?'"

Dr. Scholander concludes that until more is known about how the dolphin maintains balance under unstable conditions and better experiments are designed, the scientists "must bow to the dolphin."

Science News Letter, December 26, 1959

PUBLIC SAFETY

Bowlers Can Suffer More Than Pinched Fingers

BOWLING FANS can easily suffer more serious injuries than the pinched fingers or crushed toes that result from mishandling bowling balls.

Citing three injuries which occurred during bowling, Dr. James R. Hoon of Sheboygan, Wis., explains that the bowler can suffer from strained thigh muscles. His report appears in the *Journal of the American Medical Association* (171, 145/2087, Dec. 12, 1959).

While no bowler should follow through to the point that he goes sailing down the alley with the ball, the examples cited clearly demonstrate that trouble can occur when the bowler stops suddenly at the foul line on delivery of the ball.

Proper conditioning and training in the art of body movement during delivery of the bowling ball will help prevent such injuries, Dr. Hoon suggests.

Science News Letter, December 26, 1959

MEDICINE

Locate Rheumatoid Link

Plasma cells in the synovial membrane that lines the joints and certain cells in the lymph nodes have been pinpointed as sites of the "rheumatoid factor."

AN IMPORTANT missing link in the puzzle of rheumatoid arthritis has been established with the pinpointing of the cells that produce the "rheumatoid factor," a mysterious substance found in the blood of arthritics.

The discovery furnishes medical investigators with a new lead to the study of rheumatoid arthritis and may even provide physicians with a new technique for diagnosing the nation's number one crippling disease.

The rheumatoid factor had previously been identified, isolated and purified, but its origin had been unknown, scientists at the American Rheumatism Association meeting in Detroit learned.

A research team, headed by Dr. Robert C. Mellor of New York's Hospital for Special Surgery, Philip D. Wilson Research Foundation, has now traced the site of formation of the factor to two kinds of cells found in the body tissues of patients suffering from the disease.

These cells are the plasma cells present in the synovial membrane that lines the joints and the "large pale cells" of germinal centers of lymph nodes.

Dr. Mellor pointed out that inflammation of synovial membrane and subsequent swelling of the joints are early pathological changes that characterize the disease, and it

is in such membrane that the plasma cells are found. Swollen lymph nodes, also characteristic of rheumatoid arthritis, contain the "large pale cells."

It is known that both of these cells produce immune bodies or antibodies, one of the body's defenses against infectious disease.

The significance of Dr. Mellor's investigation lies in the fact that the rheumatoid factor behaves in certain respects like an antibody and that it is formed by cells that produce antibodies.

What remains to be clarified is whether the rheumatoid factor is in fact an antibody and, if so, which agents or materials cause the two types of cells to produce the factor in the first place. Many researchers suspect the rheumatoid factor is several antibodies.

If the rheumatoid factor has a protective purpose, then Dr. Mellor's study might provide a new lead in the search for the agent that is ultimately responsible for rheumatoid arthritis. If the factor has no antibody purpose, then its formation must be viewed as some sort of "metabolic error," he said.

Arthritis in Colitis

CONTRARY to traditional belief, the joint diseases accompanying ulcerative colitis probably are not identical with rheumatoid arthritis.

About seven percent of patients suffering from this form of colitis also have swollen and inflamed joints, symptoms long assumed to stem from rheumatoid arthritis.

A study involving 52 patients suffering from ulcerative colitis and various joint symptoms, Dr. Currier McEwen of New York University Medical College told the Rheumatism Association, indicates that this belief is probably not true.

Arthritis of the peripheral joints was found in 33 of the patients. But, in contrast to rheumatoid arthritis, this arthritis usually was temporary rather than chronic. Unlike rheumatoid arthritis which appears symmetrically (that is, in both knees, elbows or ankles), the peripheral arthritis appeared only in single joints in most cases.

Dr. McEwen also pointed out that blood tests for rheumatoid factor, a mysterious substance found in the serum of rheumatoid arthritics, proved negative in these patients.

Science News Letter, December 26, 1959

TECHNOLOGY

AEC Operates Reactor For Nuclear Safety

See Front Cover

SPERT-III, described as the nation's most versatile facility for studying nuclear reactor safety, is operated for the U.S. Atomic Energy Commission by the Phillips Petroleum Company at the National Reactor Testing Station in Idaho.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows a bird's-eye view of the general interior of the Special Power Excursion Reactor Test No. 3. The reactor top and control rod drive mechanism are visible at top center. The small white tank at bottom center is the system pressurizer. The horizontal vessels on either side are heat exchangers.

Science News Letter, December 26, 1959

PHYSIOLOGY

Succeed in Recording Whale's Heart Beat

THE HEARTBEAT of a whale has been recorded by scientists at Woods Hole Oceanographic Institution after a 45-foot, 50-ton male finwhale beached at Provincetown on the tip of Cape Cod.

The accomplishment followed years of vain attempts to study the heart function of the largest existing animal.

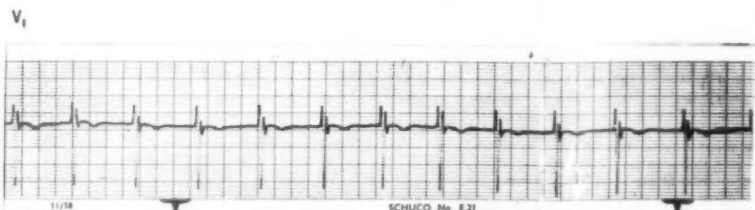
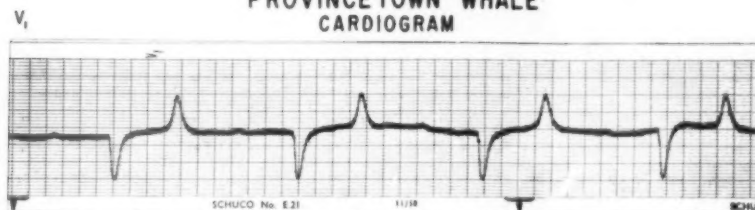
Cardiograms showed a pulse beat of 25 per minute and an estimated heart size of about 500 pounds. A normal human pulse beat is about 72 per minute and a human heart weighs about 250 grams.

As the whale's condition deteriorated there were changes in the cardiogram not unlike those seen in human cardiograms when a patient's oxygenation is impaired. It seemed the whale suffered a conduction block, a common defect in a human heart.

Efforts by the Animal Rescue League to keep the whale moist (a dry whale does not live long) and by the U.S. Coast Guard to tow him out to sea failed five times, and the whale could not be saved.

Science News Letter, December 26, 1959

PROVINCETOWN WHALE CARDIOGRAM



WOODS HOLE SCIENTIST

12/6/59

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

GENERAL SCIENCE

Reading Interlingua

YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Alexander Gode, SCIENCE SERVICE's Interlingua Division, 80 E. 11th St., New York 3, N. Y.

Financial contributions to the Interlingua program are needed.

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Entomologia.—Un recente enquete in le Statos Unite ha revelate que solmente le statos de Montana e Wyoming ha insectos que ha non ancora developate resistentia contra insecticidas chimic. In certe partes del pais, le insectos ha jam comenciate facer se resistente contra insecticidas introducite minus que tres annos retro. Le lucta del industria chimic contra le insectos es un lucta continue, e il non es certe que le ultime victoria va pertiner al ingeniositate human. Insectos deveni resistente contra insecticidas per varie mechanismos. Istos include (1) le retardation del absorption, (2) alterationes enzymatic que rende le insecticidas innoce, (3) le canalisation del insecticidas verso non-sensible partes del organismo del insectos, e (4) le migration e acostumation del insectos a altere habitats.

Oceanographia.—Durante lor studios del Oceano Arctic, un gruppo de scientistas ab le Observatorio Geologic Lamont del Universitate Columbia ha discoperite un grande "insula submarin" al nord de Siberia. Le superficie se trova a minus que 300 m infra le superficie del oceano, e su area es circa 40,000 km². A su margines, le profundor del aqua cresce abruptemente a quasi 3000 metros. Le vita marin super e supra le "insula" es multo plus abundante que in altere partes del Oceano Arctic.

Recercas de Cancere.—Studios conducte al Schola Medical del Universitate Indiana per Drs. J. Ashmore, R. Uhl, e A. S. Levine ha demonstrate que cellulas cancerose ha un grande appetito pro glucosa, le qual illos utilisat approximativemente septe vices plus rapidamente que cellulas normal. On spera trovar un substantia que cellulas de cancer accepta tanto avidamente como illos accepta glucosa, sed un substantia que destrue los.

Astronautica.—Recentemente le statunitense satellite Explorer VI habeva un breve visita de un nove typo de rochetta, tecnicamente designate como ALBM 199B (acro-lanceate projectil ballistic = in anglose "Air-Launched Ballistic Missile"). Le rochetta esseva lanceate—primariamente pro probar un nove systema de direction—ab un bombardier in volo; illo attingeva le vicinitate del satellite, e retornava al terra. On spera utilizar tal rochettas in le futuro pro photographar satellites in orbita (a fin de poter studiar le effectos de lor collisiones con meteorites), pro reparar los, pro retornar los a terra, e mesmo pro apportar provisiones al personal de stationes cosmic. Le rochettas poterea etiam destruer le satellites de inimicos.

Physica Atomic.—Strontium-90 es non solmente un isotope periculosissime, su presentia es etiam satis difficile a demonstrar. Dr. P. F. Gustafson del Laboratorios National Argonne in Illinois reporta que in plure specimens de terra studiade per ille, le proportion inter cesium-137 e strontium-90 esseva si constante que le determination quantitative del prime de iste duo isotopos permitteva le calculation del concentration del secundo con un error de solmente 20 pro cento. Isto es importante proque cesium-137 es facile a determinar. Dr. Gustafson insiste que su constatacion require le corroboracion de investigationes additional.

Geometria.—Como debe on distribuer un certe numero de punctos al superficie de un sphaera a fin que omne le punctos ha le mesme distantia le unes ab le alteres e a fin que iste distantia es le plus grande possibile? Le solution de iste problema es cognoscite pro novem

e dece-duo punctos. Nunc Dr. R. M. Robinson reporta lo pro 24 punctos. Si le superficie de un sphaera es totalmente coperte per lineas de longor equal que es disponite de maniera que illos forma 32 triangulos e sex quadratos (con le punctos de tres triangulos coincidente con cata un del quatro punctos del quadratos), le 24 punctos del sex quadratos es le punctos cercate. Iste constatacion es un facto de "scientia pur," i.e., illo ha a iste tempore nulle application practice.

Astronautica.—Proque usque nunc il ha nulle "astronautas" human sed solmente animal—canes russe e simias american—on ha nulle reporto relative a lor sensationes, emotiones, e reactiones generalmente psychologic sub le effecto del ambiente extraterrestre. Animales non parla. Pro meliorar iste situation al minus in un certe grado, le simia que le americanos prepara al rolo de viagiator de spatio cosmic—ille es un miere rheso de duo annos de etate—es subijcite a un rigorose trainamento de reflexo conditionate. Quandocunque ille vide un certe lumine, ille deprime un levator pro evitar un leve choc electric. Durante su viage extraterrestre ille va vider le lumine e va haber un levator a deprimer. Su reactiones va esser registrate, e on va apprender si o non su reflexos conditionate remane intacte quando ille quita le terra e le influentia de illo.

Electricitate.—Le corporation Electric Westinghouse reporta le perfectionamento de un nove material de insulation que es 300 vices plus efficace que insulatores traditional. Ille es un epoxy-resina que pote esser applicate per aspersion o pingitura.

Radio-isotopos.—Le utilisation de radio-isotopos in le industria, le medicina, e altere phases de activitate human se expande rapidissime, e on audi frequentemente discussiones del problema de como on pote disembarassar se del isotopos que es troppo degradate pro esser ancora de uso sed que retene un radioactivitate satis forte pro que illos non pote esser considerate como innocente. Il es interessante notar que iste problema existe de facto solmente pro isotopos producite secundariamente in fissiones nuclear. Isotopos generate per irradiation in reactores nuclear pote esser regenerate per le mesme processo e non debe unquam esser considerate como "discartabile."

Ornithologia.—Le sturnos (*Sturnus vulgaris*) ha completate lor conquesta del Statos Unite. Originari de Europa, le prime sturnos esseva exponte a New York in 1890. Lor progressive colonisation del Nove Mundo portava los a California in 1842. Recentemente sturnos esseva vidite in le vicinitate de San Diego, le sol parte del pais que illos habeva non ancora invadite.

Evolution.—Dr. M. Calvin del Universitate California ha constatate in meteorites compositos chimic de character heterocyclic que non plus existe in stato independente in le terra ubi illos occurre hodie solmente como elementos in le structura del nucleotidos, i.e. de materia organica. Le constatacion de Dr. Calvin es importante como prova del existentia extraterrestre de precipemente le compositos que on considera como precursores del plus primitive formas de vita in le passato de nostre planeta.—Hodie, cento annos post Darwin, on recognosce que le ultime problema del evolution es un problema chimic, illo del transition de compositos inerte a moleculas vive. Le laboreres de Dr. Calvin ha provate le existentia extraterrestre de formas "inerte" de moleculas "vive," i.e. de precursores de substantias vermente organica.

Science News Letter, December 26, 1959

PUBLIC HEALTH

U. S. Suffers Radiophobia

"Radiophobia," a fear of radiation from X-rays that is becoming widespread in the United States, is believed to endanger persons who may possibly need X-ray treatment.

MANY AMERICANS are suffering from a new phobia: radiophobia.

It is characterized by a slight pallor that develops at the mention or sight of the words "radiation" or "X-ray," the simple failure to report for prescribed X-ray treatment, and the consumption of valuable professional time in re-explaining the value of radiation in medical care.

This is disclosed in *The New Physician* (Dec. 1959), the journal of the Student American Medical Association, by Dr. Robert G. Zach of Monroe, Wis., and David S. Goodman of Milwaukee.

The phobia, which has also been referred to as "nuclear neurosis," spread in the wake of the National Academy of Sciences' learned summary on the genetic hazards of radiation in June, 1956.

Now, more than three years later, "after strenuous efforts in defense of X-ray, radiophobia is believed by many to be definitely under control, but it is also believed to have been driven into the subconscious, where it still smolders like a peat bog fire," the scientists say.

Radiologists and others have feared that the maltreatment of just one patient by an inexperienced practitioner, if publicized by a careless writer, could bring the fire back to the surface and perhaps usher in an era

of ill-considered legislation. This could also lead to further public anxiety and under-use of a valuable medical tool.

A healthy awareness of the hazards of X-radiation is desirable, however, the scientists point out. Farsighted individuals in and close to the medical profession have seen the scare as a mixed blessing that possibly helped to curb excesses in the use of radiation and make even competent users more aware of the possibilities for reducing exposure to the patient and to themselves.

Among major conclusions that appear to be emerging from the more responsible public writing and speaking following the publication of the report, they say, are these:

1. Efforts to find ways and means to reduce exposures to the patient should be pursued with renewed vigor, and knowledge of them spread as widely as possible.
2. Laymen need to be re-educated to the importance of leaving the question of radiation up to their physicians, who alone can be the judge of its need in any particular case.
3. Fears engendered over exposures to the reproductive glands are not justified by the dosages given in the routine of more common uses of X-ray.

Science News Letter, December 26, 1959



SPACE CAPSULE—On top of this mock-up of a space capsule is a tower 17 feet high and weighing 900 pounds, which supports at the top a small but powerful escape rocket to enable the astronaut to escape should anything go wrong during launching. The figure of a man at the right indicates capsule size.

GEOPHYSICS

Earth Solid to the Core

THE EARTH is solid down to its core, some 1,800 miles below the surface, and consists of a material about as strong as brick, higher structural strength than previously believed.

There are no convection currents slowly churning over large masses of rock as some scientists believe, Dr. John A. O'Keefe of the National Aeronautics and Space Administration reported. He said his conclusion that the earth's mantle had great strength is based on the NASA discovery earlier this year of the earth's slightly pear-like shape and a recent new determination by the Army Map Service of how much the earth is flattened at the poles.

Dr. O'Keefe told the Philosophical Society of Washington meeting in Washington that his original discovery of the earth's pear-like shape, with Ann Eckels and R. Squires, also of NASA, had been checked and confirmed by Yoshida Kozai of Harvard College Observatory. The earth's pear shape is in addition to its bulging equator, and was discovered from comparisons of the theoretical orbit of Vanguard I with its actual orbit.

He reported that the flattening of the

earth at the poles amounted to one part in 298.24 instead of the previously accepted international value of one part in 297.3. This seemingly small change confirms that the earth's structural strength is much greater than once thought.

Mechanical strength equivalent to building brick is required to support the pear-like shape, Dr. O'Keefe said.

Scientists have long known that, technically, the earth is "an oblate spheroid, slightly flattened at the poles." The amount of this flatness is measured in terms of how much shorter the radius of the earth is at the poles than at the equator. The international figure, one over 297.3, means that the polar radius is shorter by about 13 miles than the equatorial radius.

Studies of the orbital flight of Vanguard I showed that the earth's sea level is 50 feet higher in the north polar region than previously thought and 50 feet lower in the south polar region. Accentuating the pear shape is the fact that outside the polar areas, sea levels in the Northern Hemisphere are 25 feet lower than thought, and 25 feet higher in the southern Hemisphere.

Science News Letter, December 26, 1959

ASTRONAUTICS

Satellite With Telescope Planned for Fall of 1960

THE LAUNCHING of a satellite with a telescope for scanning the heavens is scheduled for the fall of 1960.

The telescope-satellite will weigh about 3,500 pounds, of which the 36-inch telescope assembly will weigh no more than 500 pounds. The satellite is expected to orbit for a year, 500 miles above the earth about once every 100 minutes.

Instruments and telescope for the satellite are being made at the University of Rochester. The satellite's equipment will be designed to record barely measurable amounts of light, at from ten to 100 Angstroms. One Angstrom equals about one two-hundred-and-fifty-millionths of an inch.

The University of Rochester space scientists hope to adapt the Haloid-Xerox, Inc., xerographic process to the telescopic system. What the telescope sees may be recorded on xerographic dry plates, then telemetered back to earth.

Science News Letter, December 26, 1959

GENETICS

Gene Patterns Studied

A YOUNG GIRL with the sex chromosomes of a male—XY—is the current example in the complicated picture of man's genetic make-up.

Although it is now firmly established that the normal chromosome number in man is 46, not 48, with 44 autosomes or "body" chromosomes and two sex chromosomes, the human "between-sexes" make it difficult to decide just what chromosomes determine maleness or femaleness.

As a result of their examination of an XY female, Dr. D. G. Harnden of the Radiobiological Research Unit, Harwell, England, and J. S. S. Stewart of the University of St. Andrews, conclude that mere possession of a Y chromosome is not in itself enough to ensure the development of male "looks." (Classically, the female human is XX while the male is XY.)

A 19-year-old girl was treated with estrogen for failure to menstruate with the beginning of puberty. Analysis of her

chromosomes showed she has the sex chromosomes of a normal male, the researchers report in the *British Medical Journal* (Dec. 12).

Even though the Y chromosome is present, they point out, there is extensive development of female characteristics. Possibly the individual's gonads or sex glands failed to develop at a very early stage of embryonic life. If this were true, a female-looking person would result although genetically she is male. In support of this theory, the British researchers note that when rabbits, either female or male, have their gonads removed at a very early embryonic stage they will develop female characteristics.

"Other factors which may or may not be genetically determined are necessary to ensure that sex differentiation is also normal," the scientists conclude.

Science News Letter, December 26, 1959

MEDICINE

Treat Ills as Psychosomatic

AT LEAST 20% of the patients a general practitioner sees are suffering from purely psychosomatic ailments, most of which can be successfully treated with a new anti-depressant drug.

This is reported in the *Virginia Medical Journal* (Dec.) by Dr. L. Floyd Hobbs of Alexandria, Va. Dr. Hobbs treated 200 patients with phenelzine, or Nardil. All of these patients had been under his personal care for at least two years.

Of the 200, 96 had no organic disease to account for their symptoms. The other 104 patients did have a proven organic disease, but in all cases the degree and number of their complaints far outweighed the severity of the organic disease present, Dr. Hobbs notes.

He estimates that the latter group comprised one-third of all patients a general practitioner sees and says that "often the management of these patients presents one of the most frustrating problems a physician can encounter."

The most commonly complained of symptoms, Dr. Hobbs reports, included gastrointestinal upset, sadness, irritability, apathy, insomnia, chronic fatigue, loss of appetite, shortness of breath, palpitations, tremors and dizziness.

The beneficial effects of phenelzine became apparent within two or three days, he says, "with maximum improvement invariably occurring in less than one month."

Two months of Nardil therapy produced improvement in 174 of the 200 patients. Dr. Hobbs rated the improvement as excellent in 49%, good in 25% and fair in 13%. The degree of improvement was based on both the doctor's judgment and the patient's own evaluation.

Dr. Hobbs reports a complete lack of toxic effects of phenelzine. Only seven patients, he says, developed side reactions necessitating discontinuing the drug.

Science News Letter, December 26, 1959

3. The tiny polio virus clusters in pure crystals inside the cell. Although scientists have previously produced crystals of viruses outside the cell and it has recently been shown that the large human herpes and adenoviruses can exist as crystals inside the cell, this is the first demonstration of small viruses of any kind inside the cell.

Drs. Fogh and Stuart are now attempting to take electron micrographs of the actual process of virus manufacture inside the cell.

Science News Letter, December 26, 1959

FLORICULTURE

Shorter Poinsettias Due With Use of Compound

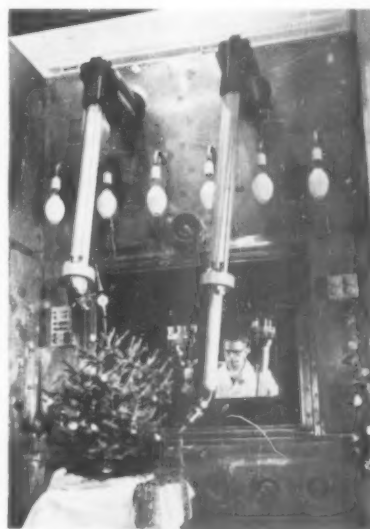
SHORTER-STEMMED and greener-leaved poinsettias may soon be available for decorating the house at Christmas time, thanks to studies made at the U. S. Department of Agriculture's research center, Bethesda, Md.

Applications of carvadin, a compound related to the growth regulator Amo-1618, produced plants only one-fourth as tall as untreated plants, Dr. Henry M. Cathey reported. The poinsettias' red and white "flowers," actually the leaf-like bracts, were only slightly reduced in size.

The compound was effective in various forms: spray, dust, as a dip or as an addition to the soil. Treatment produced greener leaves, but did not delay flowering.

Although the material is not in commercial production now, the USDA reports that "several manufacturers have indicated interest in its synthesis and potential use."

Science News Letter, December 26, 1959



TREE TRIMMING—A General Electric technician uses new mechanical manipulators at the Hanford Laboratory to trim a Christmas tree placed inside a "hot" cell for handling biggy radioactive materials, thus illustrating the delicate work that can be done.

VIROLOGY

Photograph Polio Viruses

POLIO viruses have been seen and photographed inside the human cell in which they were formed.

This is the first time this has been done, the American Cancer Society reported.

While the researchers expect that this basic study may help explain how virus infections and symptoms develop—and how infections may be blocked—some mistaken ideas on viruses have already been cleared up. Drs. D. C. Stuart Jr. and Jorgen Fogh

of the New York State Department of Health, Albany, reported the following discoveries:

1. Viruses are formed in the cytoplasm surrounding the nucleus, not in the nucleus of the cell.

2. Some 100,000 viruses, occupying only about one or two percent of the cell volume, are produced in a cell during a few hours. (It would take almost 1,000,000 polio viruses lying side by side to equal one inch.)

ASTRONOMY

Winter Constellations Brilliant

Celestial calendar for 1960 holds many interesting prospects for astronomers, while Venus and Jupiter shine brightly in early morning.

By JAMES STOKLEY

IF YOU WANT to see planets in January, you will have to get up early in the morning. An hour or so before sunrise both Venus and Jupiter are shining brightly, low in the southeastern sky. Venus is now drawing closer to Jupiter, and the pair will make a striking sight on the morning of Jan. 21. At that time Venus will be less than twice the apparent diameter of the full moon to the north of Jupiter.

In the evening skies, the brilliant constellations of winter are shining, as depicted on the accompanying maps. These show the heavens as they appear about ten p.m. (your own kind of standard time) on Jan. 1, an hour earlier at the middle of the month and two hours earlier at the end.

Most conspicuous of these star groups is Orion, high in the south. Look first for the three stars that form the belt of this celestial warrior. Above it is Betelgeuse and below is Rigel, both stars of the first magnitude. A little higher and to the right is the figure of Taurus, the bull, in which the bright star Aldebaran shines.

On the other side of Orion you will see the two dogs: Canis Major, the greater, and Canis Minor, the lesser. The large dog is below. In it is Sirius, generally known as the dog-star, the brightest that we can see in the nighttime sky. The smaller dog is higher and farther east, and in it is the star called Procyon. Still higher stand Gemini, the twins, in which there are two bright stars, Castor and Pollux, although the former is of the second astronomical magnitude. And high overhead, in Auriga, the charioteer, Capella can be seen.

Low in the east, and shown on the map of the northern half of the sky, is Leo, the lion, with another first magnitude star, Regulus. However, because this is rather low, its light is absorbed by the atmosphere, and seems somewhat fainter than it would be at greater altitude.

This is true also, to an even greater extent, of Deneb, in Cygnus, the swan, just above the northwestern horizon. If you look at it earlier in the evening, before it has descended so low, you will find it considerably brighter.

The moon goes through its phases in January with first quarter on the fifth, at 1:53 p.m., E.S.T. (Subtract one hour for central, two hours for mountain or three hours for Pacific standard time.) Full moon comes at 6:51 p.m. on the 13th; last quarter at 10:01 a.m., on the 21st; and new moon at 1:16 a.m. on the 28th. The moon is nearest to earth (at perigee) on Jan. 26, when it is 224,800 miles away. Its farthest distance, called apogee, comes on Jan. 10, with a distance of 252,300 miles.

And on Jan. 4, at 2:00 p.m., the earth is at perihelion, or nearest the sun for the year. Its distance will then be 91,342,000 miles (compared to nearly 94,500,000 miles next July 2, when we will be farthest away, or at aphelion). It is mainly because the sun is now so low in our sky that we are having cold weather, despite the sun's relative proximity.

Looking ahead to the celestial calendar for 1960, we find several interesting events in store for us.

There are four eclipses, two of the moon and two of the sun. Both of the former and one of the latter will be visible from the United States. There will be a transit of Mercury, i.e., a passage of that planet across the face of the sun, likewise visible from this part of the world. And there will be a number of occasions, most of them also visible from the U. S., when the moon will occult, or "eclipse," the bright star Aldebaran.

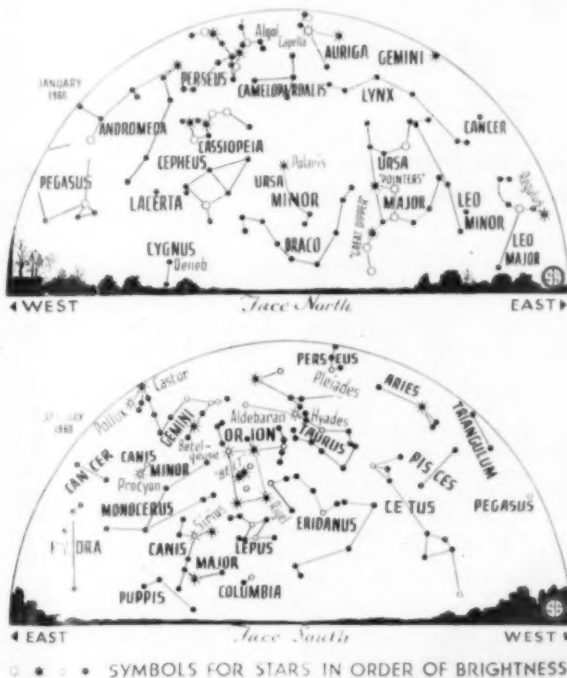
On March 13, in the very early morning hours, the moon will enter the shadow of the earth, and suffer a total eclipse. This will be visible from most of North America. Two weeks later, on March 27, part of the moon's shadow will fall on the earth, producing a partial eclipse of the sun. Australia, Antarctica and the Indian Ocean will be

the only parts of the world where this will be seen, however.

Sept. 5 brings the next, a total eclipse of the moon, this time later in the morning hours. Persons in North America except for the extreme northeastern part will be able to see the moon entering the earth's shadow, but only along the West Coast will the end be visible. Again this will be followed, on Sept. 20, by a partial eclipse of the sun. This will not be visible along the eastern coast of the United States and Canada, for it will occur after sunset. From the Midwest the sun will set while it is partly hidden by the moon. In the mountain and Pacific states, persons will be able to see it from beginning to end.

Every 116 days the planet Mercury comes between the sun and earth, to the position called inferior conjunction. Generally, at such a time it is north or south of the line from sun to earth. But about 13 times in a century Mercury comes close enough to this line that, from the earth, it is seen to pass in front of the sun. Such an event is called a transit of Mercury, and one occurs on Nov. 7, beginning at 9:35 a.m., E.S.T., and ending at 2:12 p.m. This will be visible from the United States but not to the naked eye. Through a telescope, properly fitted to observe the brilliant face of the sun, you will be able to see a tiny black dot, slowly moving from the eastern to the western edge of the solar disc.

When the moon goes in front of the sun we call it an eclipse, but when it passes between us and a star (or, rarely, another



planet) the event is termed an occultation. As it moves around the sky each month, the moon often occults stars, but mostly they are faint ones, often too faint to be seen without a telescope. Occultations of bright stars are rather uncommon. In fact, there are only four first-magnitude stars—Aldebaran, Regulus, Spica and Antares—which are in the part of the sky through which the moon moves. Hence only these can ever be occulted.

On Jan. 10, at 4:00 a.m., E.S.T., the moon will be in a phase between first quarter and full, and will occult Aldebaran, the bright star in Taurus, the bull. Each month the path of the moon across the sky is nearly the same as the preceding month, so this is one of a series of occultations of Aldebaran, which began last September, and occurs 13 times in 1960. Of these, eight will be visible from North America. Amateur astronomers will have an interesting time watching them. Several will happen in convenient evening hours.

Celestial Time Table for January, 1960

Jan. EST

- 5 1:53 p.m. Moon in first quarter.
- 10 4:00 a.m. Moon occults Aldebaran.
- 8:00 a.m. Moon farthest; distance 252,300 miles.
- 13 6:51 p.m. Full moon.
- 14 1:34 a.m. Algol (variable star in Perseus) at minimum brightness.
- 16 10:23 p.m. Algol at minimum.
- 19 7:12 p.m. Algol at minimum.
- 21 6:00 a.m. Venus passes Jupiter.
- 10:01 a.m. Moon in last quarter.
- 25 3:00 a.m. Moon passes Jupiter.
- 10:00 a.m. Moon passes Venus.
- 26 5:00 a.m. Moon nearest, distance 224,800 miles.
- 28 1:16 a.m. New moon.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, December 26, 1959

PUBLIC HEALTH

Many Cardiac Patients Can Get Life Insurance

MANY PERSONS who have heart disease, including even those who have recovered from a heart attack, can now get life insurance.

The reason for this is that life expectancy in persons with varying types of heart disease has been shown to be "vastly better" than was formerly supposed, two physicians have reported.

This knowledge has been derived from long-term studies and experience of both insurance companies and practicing physicians. Drs. Richard S. Gubner and Harry E. Ungerleider of the Equitable Life Assurance Society report in *Modern Concepts of Cardiovascular Disease* (Dec.), published monthly by the American Heart Association.

Persons born with heart defects comprise another group of cardiacs who are becoming increasingly insurable, the doctors say.

Science News Letter, December 26, 1959

PUBLIC HEALTH

Foresee Isotope Problems

WHEN APPLYING radioisotopes for industrial and other purposes, scientists must sharply distinguish between isotopes produced by irradiation and separated fission products, the conference on "The Disposal of Radioactive Wastes," organized jointly by the International Atomic Energy Agency and UNESCO, was told by the American specialist, Dr. A. W. Kenney of the Du Pont Co.

He pointed out that no disposal problem need arise if the isotope used is one which was produced by irradiation in a reactor or an atomic accelerator. Such isotopes, he said, can be returned after a few half lives, in order to be re-irradiated. The re-irradiated source can then again be applied and since this process of re-irradiation can be repeated time and time again, radioactive isotopes having been formed by irradiation practically never constitute a waste.

Separated fission products from nuclear reactors, on the other hand, which are widely used in industry and medicine today cannot be reactivated and therefore do present a great problem in regard to the disposal of this waste.

Dr. Kenney demanded that a clear labeling should always give information about the origin of an isotope, in order to know whether the source was produced by irradiation and thus can be reactivated, or whether it is a fission product, which finally will become a waste. Already today, he declared, sources of both types may be used for the same purpose. Thus in well-logging, both antimony 122 and polonium 210 are begin used as neutron sources. Antimony 122, being an irradiation product, can be reactivated, while polonium 210, a fission product, cannot.

Science News Letter, December 26, 1959

GENETICS

Relate Growth to Tumors

IT IS NOT how fat the mice are, but how well-developed their bones and muscles are that appears to be related to lung tumors in mice.

There is a "highly significant" relationship between the number of lung tumors and body length, muscle weight and bone length, two researchers at the National Cancer Institute, Bethesda, Md., report. A similar relationship may exist between human body types and cancer, they suggest.

By crossing two strains of mice, one genetically highly susceptible to pulmonary tumors while the other carried the recessive gene for obesity, Drs. George Vlahakis and W. E. Heston obtained offspring with both characteristics. Nearly all the mice of the second generation had lung tumors, but the non-obese mice had almost twice as many as the obese group.

Although the obese animals weighed more than their "normal" brothers and

sisters, analysis showed they were actually smaller animals, the researchers point out in the current issue of *The Journal of Heredity* (50, 99, May-June, 1959).

Measurements taken included the femur or thighbone and the gastrocnemius, the large muscle in the calf of the leg. The mice were also measured from the tips of their noses to the tips of their tails. In all cases the obese mice were significantly smaller in these three body measurements.

Noting that earlier studies have shown that "women most likely to develop breast cancer are those with good skeletal and muscular development with some tendency toward obesity rather than the very obese women," Drs. Vlahakis and Heston suggest that "it would be interesting to know what correlations exist in man in respect to other neoplasms, particularly lung cancer," and body types.

Science News Letter, December 26, 1959

OPERATIONS RESEARCH

Computers for Baseball

AN ELECTRONIC COMPUTER has been used to decide whether a sacrifice, stolen base or intentional walk is the best baseball strategy under given conditions.

Richard E. Trueman of the University of California at Los Angeles told the Operations Research Society of America meeting in Pasadena, Calif., that an International Business Machines 709 computer had been instructed how to "play" individual innings.

Batting statistics of a representative major league lineup form the starting point. From these, tables are made showing the probability of selecting each of 13

possible plays. Individual innings are then "played" by the computer, using random numbers to select the plays.

Some 5,000 innings are played for each possible combination of initial conditions, Mr. Trueman reported. The initial conditions can be varied according to the lead-off batter in the inning, location of base runners, and number of outs.

For each initial condition, statistics are kept on the probability of scoring a given number of runs, the average number of runs scored, and the probability of a double play occurring.

Science News Letter, December 26, 1959

HEMATOLOGY

Hemoglobin in Adult and Infant Strikingly Similar

THE BLOOD'S oxygen-carrying hemoglobin is not as different in adults and infants as scientists think, two researchers report in *Science* (130, 1574, Dec. 4, 1959).

A "surprising" discovery is that there are striking similarities in the two groups' peptides—combinations of amino acids which, in turn, are the basis of proteins. Previously it had been thought synthesis of the two hemoglobins was under the control of two separate genes.

Of the 19 peptides analyzed, 11 were qualitatively the same, report Drs. Arnold M. Katz of the National Heart Institute, Bethesda, Md., and Amos I. Chernoff of the University of Tennessee's Memorial Research Center and Hospital. Five showed minor differences and only three appeared to be very different. However, the researchers point out that only 65% of the expected number of peptides has been found and more differences may be detected.

It is also possible, Drs. Katz and Chernoff note in conclusion, that hemoglobin differences may not be caused by genes, but may reflect differences in individual adults and infants.

Science News Letter, December 26, 1959

MEDICINE

Magnetism Aids Man In War Against Disease

MAGNETIC forces are healing some of man's ailments.

Magnetism is being used by researchers to direct healing chemicals to a particular part of the body. These chemical particles are known as alpha iron crystals. They have the ability to pass through the tiniest capillaries of the body, Dr. Michael W. Freeman, Detroit, and Anthony Arrott of the scientific laboratory of the Ford Motor Company, Dearborn, reported at a conference on magnetism and magnetic fields in Detroit, Mich.

These iron crystals actually carry isotopic radiation or some adsorbed healing chemical throughout the body. The crystals can be alloyed with the properly selected radioactive element, or coated with an adsorbed layer of a therapeutic agent, Dr. Freeman said.

The first patient to receive alpha iron particles, was a six-year-old boy suffering idiopathic thrombocytopenic purpura, a disease characterized by hemorrhages, purple patches on the skin and a reduction in the number of blood platelets.

He was given iron crystals which he absorbed under his tongue. Within ten minutes after each such treatment, the serum iron in the boy's blood increased by 70%.

While the researchers do not pretend to understand fully the reasons for this reaction, they suggest that it may be connected with blood kinetics and enzyme activity.

It had been shown earlier that mice, when subjected to a magnetic field of from 3,000 to 6,000 gauss for from one to four

weeks, experienced a decrease in white blood cells. When removed from this environment, however, their white cell count jumped more than 70% normal values.

This effect has been used to reduce the death rate due to cancer from cobalt radiation.

Science News Letter, December 26, 1959

METEOROLOGY

Balloons Yield Useful Pacific Weather Data

RADIO-EQUIPPED balloons flying at constant altitude from Japan across the Pacific Ocean and the United States to the Atlantic can yield valuable weather data at a reasonable cost.

This is the conclusion of J. K. Angell of the U. S. Weather Bureau, Washington, from a study of balloons following the winds eastward from Japan during the period from September, 1957, to April, 1959. Cost of operating the constant-level balloons, called transondes, can be as low as \$75 for each wind reading.

This cost can not be compared with that for obtaining wind data from weather ships, since such measurements show winds, temperatures and pressures at various levels, and the ships also serve as rescue units in cases of emergency. Mr. Angell urges the continued use of balloons, particularly superpressure balloons, to determine wind conditions high over the Pacific. Mr. Angell's report on the use of transonde data appears in the *Journal of Geophysical Research* (Nov. 1959), a publication of the American Geophysical Union supported by the National Science Foundation and the Carnegie Institution of Washington.

Superpressure balloons, Mr. Angell reports, represent virtually no hazard to aircraft and are probably capable of circumnavigating the hemisphere.

"It is believed that, on the basis of the usefulness of the transonde data obtained during 1958-1959, a very good case can be made for operational and research purposes," Mr. Angell concludes.

Science News Letter, December 26, 1959

ASTRONOMY

New Comet Discovered Low in Southeast Sky

A NEW COMET bright enough to be seen with binoculars has been discovered low in the southeast sky.

Of eighth magnitude, the comet was spotted in the constellation of Libra, the scales, which is visible from the United States near the southeast horizon shortly before sunrise. The diffuse stellar object, which has a short tail, will be known as Comet Mrkos after its discoverer, Antonin Mrkos of the Astronomical Observatory at Skalnaté Pleso, Czechoslovakia.

Report of the Dec. 3 sighting was cabled by Miss J. M. Vinter-Hansen to Harvard College Observatory, Cambridge, Mass., clearing house for astronomical information in the Western Hemisphere.

When discovered, the comet's right ascension was 15 hours, four minutes; its declination, minus 11 degrees, 50 minutes.

Science News Letter, December 26, 1959

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AUTOMATING THE MANUFACTURING PROCESS—George F. Hawley—*Reinhold*, 147 p., illus., \$4.95. A sober analysis of what is involved in automation of complex mechanical processes.

BIENNIAL REVIEW OF ANTHROPOLOGY 1959—Bernard J. Siegel, Ed.—*Stanford Univ. Press*, 273 p., \$6. Summarizes papers and monographs in fields of major current interest.

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BRITISH PARASITIC FUNGI: A Host-Parasite Index and a Guide to British Literature on the Fungus Diseases of Cultivated Plants—W. C. Moore—*Cambridge Univ. Press*, 430 p., \$8.50. Reference work.

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FUEL ELEMENTS CONFERENCE HELD AT GATLINBURG, TENN., 1958—AEC (OTS), 303 p.,

illus., paper, \$5. Papers and discussion of developments in reactor fuel technology.

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HANDBOOK OF SOUTH AMERICAN INDIANS, Vol. 7: Index—Julian H. Steward, Ed.—*Smithsonian Inst. (GPO)*, 286 p., \$2. Concluding part of Bulletin 143 of the Bureau of American Ethnology.

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TROUBLED PEOPLE ON THE JOB—Am. Psychiatric Assn., Comm. on Occupational Psychiatry—*Mental Health Materials Center*, 30 p., illus., paper, 50¢. Hints about handling "emotional disturbance."

23RD ANNUAL REPORT 1959—Ohio State University Research Foundation, 38 p., illus., paper, \$1.25. Review of research projects.

WILDLIFE OF MEXICO: The Game Birds and Mammals—A. Starker Leopold—*Univ. of Calif. Press*, 568 p., illus., by Charles W. Schwartz, photographs, maps, \$12.50. Criteria for identification range maps, natural history of animals, and report on present status of species.

WONDERS OF THE DOG WORLD—Leon Whitney—*Dodd*, 62 p., illus., by Ernest Hart, \$2.95. Veterinarian discusses physical and behavior aspects of dogs.

Science News Letter, December 26, 1959

PUBLIC HEALTH

Watches Sold to Public Containing Strontium-90

THE ATOMIC Energy Commission and the American Rolex Watch Corporation of New York are attempting to recover Rolex GMT-Master wrist watches, a special type of navigation watch manufactured in Switzerland. One watch of this type, purchased abroad, has been found to contain radioactive strontium-90 in the luminescent material on the markings and numerals of its movable rim. The quantities are sufficient to present a possible long-term health hazard to the wearer. About 600 of the watches have been imported by the company between October, 1956, and November, 1959.

Science News Letter, December 26, 1959

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ROCKETS AND MISSILES

Lifting Power Can Be Found by New Formula

TWO UNIVERSITY of Virginia chemists have derived a time-saving formula for figuring the lifting power of solid rocket fuels.

Merritt M. Birky and Dr. Loren G. Hepler have been experimenting with perchlorates of potassium, ammonium and lithium, powerful ingredients of solid fuels used in rockets. Using a hand-made instrument so precise that it recorded temperatures to 1/5,000th degree centigrade, they measured the heat given off when these materials dissolved in water.

Their experiments, said Dr. Hepler, "have helped to provide a mathematical short-cut, which will be published, and which could save a lot of time for the engineers who are mixing solid rocket fuels."

Science News Letter, December 26, 1959

Questions

GEOPHYSICS—How are the earth's consistency and its pear shape related? p. 429.

MEDICINE—What connection may there be between the rheumatoid factors and antibodies? p. 427.

PUBLIC HEALTH—What are the suggested methods for storing atomic wastes in glass? p. 426.

Photographs: Cover, Phillips Petroleum Company-National Reactor Testing Station; p. 427, Woods Hole Oceanographic Institution; p. 429, McDonnell Aircraft Corporation; p. 430, General Electric Company; p. 436, Eastman Chemical Products, Inc.

Do You Know

Quartz crystals lacking the uniform high quality that would qualify them for electronics use have potential uses in lapidary work for costume jewelry or as seed material for synthetic crystal production.

U. S. per capita consumption of apples is less than half of what it was 50 years ago.

It is estimated that there are now 1,000,000 Americans, alive today, who have been cured of cancer in the sense that they have not shown evidence of the disease at least five years after diagnosis and treatment.

Leptospirosis can kill young calves within 12 hours after the disease strikes a herd.

Formerly plentiful, the rhinoceros in Malaya is becoming a vanishing breed due to unscrupulous hunters in quest of horns sought for their supposed medicinal value.

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TOY DISH WASHING SET of unbreakable polyethylene contains a dish pan, dish drainer, silverware holder, silverware tray, dish scraper and garbage receptacle with cover. All are scaled to small size but, nevertheless, provide the means for the little girl to help mother in actual washing of dishes.

Science News Letter, December 26, 1959

MULTI-PURPOSE BINS of polyethylene may be used individually or stacked in units of two or three. Available in four colors, the bins may be used to store fruits and vegetables, as flower planters, as beds for small animals, as sewing catch-alls or doll cradles, or as portable holders for cleaning supplies.

Science News Letter, December 26, 1959

FOOD CUTTER may be used to ripple, shred, garnish, waffle, slice and julienne fruits and vegetables. It may also be used to prepare eye-catching garnishes.

Science News Letter, December 26, 1959

TOY DOCTOR KIT consists of a plastic visiting bag containing a variety of toy instruments including an otoscope, a hypodermic syringe and a stethoscope. The kit, shown in the photograph, also includes a



medicine cabinet for the young "physician's" office.

Science News Letter, December 26, 1959

LIQUID CEDAR for protecting furs and woolens and repelling undesirable odors, is clear and fast penetrating. It can be applied to any bureau drawer or closet with an ordinary paint brush or spray gun. When dry, it is said to leave a lasting protective cedar smell.

Science News Letter, December 26, 1959

POOL PORTABLE ENCLOSURE of clear plastic permits year-round swimming in an outdoor pool. The inflatable enclosure has no structural members but is air-supported by a small 1/10-horsepower blower. Held in place by water tubes in its base or by sand bags, it can be erected in two hours by two people. Standard sizes up to 40 by 60 feet are available.

Science News Letter, December 26, 1959

AUTO BRAKE CONTROL is fastened to the front, right floor of the car so that the instructor riding with a beginning driver may stop the car quickly in case of an emergency. It may be quickly installed by a mechanic and, although it operates as surely as the driver's brake pedal, the control is entirely independent of the regular brake.

Science News Letter, December 26, 1959

OVERHEAD DOOR OPERATOR, especially designed for oversize garage doors, automatically unlocks and opens or closes and locks the door at the push of a button. Equipped with enough lifting force to operate doors up to 10 feet high and 20 feet wide, the unit has a built-in safety feature that stops the door at the slightest interference.

Science News Letter, December 26, 1959

Nature Ramblings

By HORACE LOFTIN

AS COLD WEATHER sees the rise of colds, sniffles and flu across the nation, over and over again the blame will be placed on "the bug" or "the virus."

It was not many years ago that we first learned of the existence of these viruses, sub-microscopic organisms that appear to be about as much mineral as animal. It is still something of an open question whether or not viruses are living creatures. In common with plants and animals, they appear to reproduce—but only in the presence of a plant or animal cell. They seem to "take over" the protein-manufacturing processes of the infected cell, making it produce more viruses.

Like non-living chemical substances, some viruses have been converted in the laboratory to crystals. These crystals can then become infective viruses.

Considerable research is being centered on the viruses, especially on their role as agents of human and animal diseases. Polio, for example, is a virus disease, as is

Plants and Viruses



influenza and a host of other human ailments. In other human diseases of unknown origin, a virus is the chief suspect. These are under constant study in the laboratory.

Less well-known is the vast amount of research effort being poured into the study of plant virus diseases. Viruses attack and destroy or lessen the yield of a great number of our farm crops. They cause loss of costly ornamentals and ruin shade trees. Research centers are probing the secrets of plant viruses. Many a potted plant in university greenhouses becomes a test tube for virus disease investigation.

Control of plant virus disease is a distant goal, apparently. No way is known to "vaccinate" a field of commercial plants. Resistant strains of plants are hard to come by, while the insects that often spread the virus diseases are hard to control.

Farmers in Florida have suffered large losses in seed production of certain legume plants because of a virus spread by tiny aphid insects.

Researchers at the University of Florida have found one means of control which allows cultivation of at least two crops of this legume before seeds become overly infected with the virus. They have learned that a heavy row of rye around the legume field acts as a "green fence" which slows down the invasion of virus-laden aphids into the legume crop. By planting such strips around the field, farmers have almost doubled the yield of legume seeds.

Such temporary control is the first step. Now the scientists are seeking permanent control of plant viruses.

Science News Letter, December 26, 1959

sought for their supposed medicinal value.

Labcraft, 83 Fifth St., Cambridge, Massachusetts.